Pacific Gas and Electric Company®

Paula Gerfen
Site Vice President

Diablo Canyon Power Plant
Mail code 104/6/605
P.O. Box 56
Avila Beach, CA 93424

805.545.4596
Internal: 691.4596
Fax: 805.545.4234

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PG&E Letter DCL-20-039

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Docket No. 50-323, OL-DPR-82
Diablo Canyon Unit 2
One Hundred Eighty Day Steam Generator Report for Diablo Canyon Power Plant Unit 2 Twenty-First Refueling Outage

Dear Commissioners and Staff:

Diablo Canyon Power Plant (DCPP) Technical Specification (TS) 5.6.10 requires a report to be submitted within 180 days after initial entry into Mode 4 (Hot Shutdown) following completion of steam generator (SG) inspections performed in accordance with TS 5.5.9. The enclosure provides the 180-day report for SG inspections performed during the DCPP Unit 2 Twenty-First Refueling Outage.

Pacific Gas & Electric Company makes no new or revised regulatory commitments (as defined by NEI 99-04) in this letter.

If there are any questions or if additional information is needed, please contact John Arhar at 805-545-4629.

Sincerely,

Paula Gerfen

dqmg/6192/50943041-1
Enclosure
cc: Diablo Distribution
cc/enc: Scott A. Morris, NRC Region IV Administrator
Christopher W. Newport, NRC Senior Resident Inspector
Balwant K. Singal, NRR Senior Project Manager
State of California, Pressure Vessel Unit

ONE HUNDRED EIGHTY DAY STEAM GENERATOR REPORT
FOR
DIABLO CANYON POWER PLANT UNIT 2
TWENTY-FIRST REFUELING OUTAGE

ONE HUNDRED EIGHTY DAY STEAM GENERATOR REPORT FOR DIABLO CANYON POWER PLANT UNIT 2 TWENTY-FIRST REFUELING OUTAGE

Pacific Gas and Electric Company (PG&E) performed eddy current testing (ECT) inspections of the Diablo Canyon Power Plant (DCPP) Unit 2 steam generators (SGs) during the DCPP Unit 2 Twenty-First Refueling Outage (2R21) in October 2019. The inspections were conducted in accordance with DCPP Technical Specification (TS) 5.5.9. These were the third in-service inspections conducted on the Unit 2 SGs since they were replaced in the DCPP Unit 2 Fourteenth Refueling Outage (2R14).

The condition monitoring (CM) assessment concludes that, based on the results of the 2R21 inspections, none of the SG performance criteria were exceeded since the last ECT inspection in DCPP Unit 2 Eighteenth Refueling Outage (2R18), that is, the three-cycle operating period between the start of Unit 2 Cycle 19 and the end of Unit 2 Cycle 21. The operational assessment, not included in this report, concludes that there is reasonable assurance that operation of the DCPP Unit 2 SGs until the planned shutdown following Unit 2 Cycle 25 (four operating cycles) will not cause any of the SG performance criteria to be exceeded.

A detailed description of the 2R21 SG inspection, CM, and operational assessment are documented in Westinghouse report SG-CDMP-19-15. The inspections and CM are summarized in the 180-day report as required by TS 5.5.9.

- Section 1.0 provides background information including SG design features and SG operation summary.
- Section 2.0 provides the scope of inspections performed.
- Section 3.0 provides the results of primary side inspections and CM.
- Section 4.0 provides the results of secondary side inspections and integrity assessment.

Pursuant to TS 5.6.10, a report shall be submitted within 180 days after initial entry into MODE 4 (Hot Shutdown) following completion of an inspection performed in accordance with TS 5.5.9. DCPP Unit 2 entered Mode 4 on November 18, 2019.

The report shall include:

a. the scope of inspections performed on each SG.

See Section 2.0 for the scope of inspections performed.

b. active degradation mechanisms found.

   See Section 3.0 for discussion of tube support plate (TSP) wear which was the only active degradation mechanism identified.

c. nondestructive examination techniques utilized for each degradation mechanism.

   See Section 3.0 for nondestructive examination techniques utilized.

d. location, orientation (if linear), and measured sizes (if available) of service induced indications.

   See Table 2 for location and measured sizes of the TSP wear indications.

e. number of tubes plugged during the inspection outage for each active degradation mechanism.

   No tubes were plugged.

f. total number and percentage of tubes plugged to date.

   Three tubes in SG 2-4 were plugged in the factory using weld plugs. The percentage plugging in SG 2-4 is 0.07 percent. No tubes are plugged in SG 2-1, SG 2-2, and SG 2-3.

g. the results of CM, including the results of tube pulls and in situ testing.

   Section 3.0 provides the results of primary side inspections and CM. Section 4.0 provides the results of secondary side inspections and integrity assessment. No tubes required removal or in situ testing.

1.0 Background Information

1.1 SG Design

DCPP Unit 2 is a four-loop plant with Model Delta 54 steam generators. Each SG includes 4,444 tubes fabricated from Alloy 690 thermally treated (A690TT) material. Each tube has a nominal outer diameter of 0.75 inch with a 0.043-inch thickness. The tubes in Row 1 and Row 2 have a nominal tube thickness of 0.044 inch. The tubes are full-depth hydraulically expanded into the tubesheet. The end of each tube was tack expanded with a urethane plug expansion process prior to making the autogenous seal weld at the primary tubesheet. The

tube bundle consists of 96 rows and 119 columns of tubes arranged in a triangular pattern with a pitch of 1.144 inches, which results in tube-to-tube centerline distances of 0.572 inch between adjacent rows and 0.9907 inch between adjacent columns. The tubes in Rows 1 through 16 were full-length stress relieved after the U-bends were bent.

The straight lengths of the tubes are supported by eight stainless steel TSPs, 1.125-inch thick, and have broached trefoil-shaped tube holes. The first TSP is located 20 inches above the secondary tubesheet and the span between subsequent TSPs is 44 inches (centerline-to-centerline). The tubes are supported in the U-bend by three sets of stainless-steel V-shaped anti-vibration bars (AVB). The AVB width is 0.71 inch with a thickness of 0.2375 inch. The lowest tube row supported by AVBs is Row 8, except for Tube Columns 1-2 and 118-119 where all rows are supported.

Each SG has a feedwater feedring. Each feedring contains 38 spray nozzles to distribute the feedwater into the SG. The spray nozzles have small 0.27-inch diameter holes to help prevent the introduction of foreign material of significant size.

Figure 1 provides the Westinghouse Delta 54 SG tubesheet map depicting the row and column numbers. Figure 2 provides the Westinghouse Delta 54 SG sketch depicting the tube support plate naming convention.

1.2 SG Operation Summary

The original DCPP Unit 2 Model 51 SGs that contained mill-annealed Alloy 600 (A600MA) tubing were replaced with Model Delta 54 SGs during 2R14 in 2008.

DCPP TS 5.5.9.d defines the SG inspection periods. Table 3 provides the SG inspections over time. The 2R21 SG inspection is the third inspection, following inspections in 2R15 and 2R18. Following the first inspection in 2R15, Unit 2 entered the first TS sequential period of 144 effective full power months (EFPM). As of 2R21, the SGs operated for 110 EFPM since 2R15. Therefore, Unit 2 is still in the first period.

DCPP TS 5.5.9 allows SG operation without inspections up to 72 EFPM or three refueling outages, whichever is less. Because 56 EFPM have accumulated since the prior inspection in 2R18 (3 cycles ago), SG operation without inspections is limited to three refueling outages.

DCPP TS 5.5.9 requires that 100 percent of the tubes be inspected in each sequential period, and to inspect 50 percent of the tubes by the refueling outage nearest the midpoint of the period and the remaining 50 percent by the refueling outage nearest the end of the period. 2R21 is the refueling outage nearest the end of the 144 EFPM period. Therefore, at least 50 percent of the tubes were

required to be inspected in 2R21; however, 100 percent of the tubes were inspected.

The operating interval between the 2R18 and 2R21 SG inspections was 4.63 effective full power year (EFPY). The planned operating interval from 2R21 to 2025 (4 cycles) is about 5.35 EFPY, at which time the plant is planned to be retired at the end of the operating license. The 2R21 inspection is the last planned inspection of the DCPP Unit 2 SGs; however, a license amendment request must be submitted and approved by the Nuclear Regulatory Commission (NRC) to allow operation greater than three refueling outages without an inspection.

The DCPP Unit 2 SGs operate at a nominal primary hot leg temperature (Thot) of 601°F. The SG primary side inlet pressure is 2250 psia and the SG nominal secondary side pressure is 805 psia at the SG main steam exit nozzle, thus producing a 1445 psi differential pressure across the tubes. The SG tube integrity structural performance criterion (SIPC) at 3 times normal operating pressure differential pressure (3dPNOP) is conservatively assessed at 4350 psi.

The DCPP Model Delta 54 SGs have never exhibited primary-to-secondary leakage throughout their operating life.

2.0 Inspections Performed

The 2R21 Degradation Assessment evaluated the condition of the SGs in advance of the 2R21 SG inspections to satisfy TS 5.5.9. The Degradation Assessment identified the appropriate eddy current inspection scope, probes to be utilized, and appropriate detection and sizing information for potential degradation mechanisms for the proposed inspection scope. The potential degradation mechanisms were identified as TSP wear (existing), AVB wear (potential), and foreign object wear (potential). AVB wear and foreign object wear have never been detected in DCPP Unit 2 Model Delta 54 SGs.

In 2R21, the following tube ECT inspection criteria, visual inspection criteria, and maintenance was implemented.

Primary side inspections:

- a full-length (tube end to tube end) bobbin coil probe inspection on 100 percent of the in-service tubes in each SG
- +POINT rotating probe inspections:
    - 100 percent of bobbin “I” codes.
    - 100 percent of dent indications greater than or equal to 5.0 volts
    - 100 percent of ding and dent indications greater than or equal to 1.0 volt that were not previously examined with +POINT

  - 100 percent of U-bend regions that were impacted during manufacturing
  - 100 percent of region of interest locations where the measured tube noise exceeded pre-established threshold values
- visual inspections of six welded plugs that were installed in three tubes in SG 2-4 in the factory.
- visual inspection of each SG channel head in accordance with Westinghouse Nuclear Safety Advisory letter (NSAL 12-1) recommendations

Secondary side inspections and maintenance:

- sludge lancing of the top of tubesheet in each SG
- top of tubesheet visual inspections and Foreign Object Search and Retrieval (FOSAR) in each SG to determine the post-lancing condition of the tubesheet and to retrieve foreign objects that were not removed by lancing
- no inspections on the upper SG internals

3.0 Results of Primary Side Inspections and Condition Monitoring

Table 1 summarizes the ECT indications detected during the 2R21 eddy current inspections. The only tube degradation detected in 2R21 was tube wear at TSP intersections. The Table 1 indications that represent TSP wear are distorted support indications (DSI) reported by bobbin coil that were confirmed by +POINT probe as support wear indications (WAR). Potential tube degradation due to AVB wear and foreign object wear were not detected.

A CM evaluation of the SG tube bundles was performed to verify that the condition of the tubes, as reflected in the inspection results, complies with the SIPC and the accident induced leakage performance criteria (AILPC).

3.1 TSP Wear

Table 2 provides a listing of the TSP wear indications reported in 2R21, including the +POINT probe depth and length sizing results. These results are discussed below.

There were twenty-two (22) DSI reported by the bobbin coil probe. Twenty (20) of these indications were confirmed with the +POINT probe and characterized as single land contact wear at broached TSP intersections in SGs 2-2, 2-3, and 2-4. Two (2) of the DSI were not confirmed by the +POINT probe inspection. Fifteen (15) of the TSP wear indications were previously reported during the 2R18 inspection. Five (5) indications were newly reported during the 2R21 inspection.

All TSP wear flaws were sized using the +POINT probe EPRI Examination Technique Specification Sheet (ETSS) 96910.1 technique and the bobbin coil EPRI ETSS 96043.4 technique. The +POINT probe sizing reported maximum

depths ranging from 4 percent through-wall (TW) to 14 percent TW, total axial lengths ranging from 0.23 inch to 1.25 inch. The depth profiles revealed that all flaws exhibited shallow taper angles less than 1 degree and most less than 0.5 degrees.

All TSP wear indications were left in service because the TW depths are less than the 40 percent TW plugging criteria defined in TS 5.5.9.c, and because SG tube integrity will be maintained for the next 4 cycles based on performance of an operational assessment.

A CM assessment was performed separately for the +POINT probe and the bobbin coil as different CM limits result from the different ETSS sizing technique uncertainties. For both techniques, the SIPC and AILPC are satisfied for CM. The following is a summary of the CM assessment applying the +POINT probe.

The CM limit for single land broached TSP flat wear over the entire TSP thickness is 42.4 percent TW using the +POINT probe ETSS 96910.1 sizing technique. The CM limit increases to 46.7 percent TW and 53.1 percent TW for tapered wear angles of 0.5 degree and 1 degree, respectively. The calculated CM limits assumed axial flaw lengths of the full TSP thickness with corresponding adjustments for the taper angle. The CM limit contains tube material, burst relation, and ETSS sizing uncertainties at 0.95 probability and 50 percent confidence level (95/50); therefore, the measured flaw sizes can be compared directly to the CM limit.

The largest TSP wear depth measured by the +POINT probe was 14 percent TW and was well below the CM limits for flat and tapered wear. Therefore, the SIPC for tube burst is satisfied at a 3dPNO loading condition, with significant margin. For volumetric wear flaws with pressure-only loading condition, as is the condition for TSP wear, tube burst, and ligament tearing (i.e., pop-through) are coincidental; therefore, satisfaction of the tube burst criteria at 3dPNO also satisfies the AILPC at steam line break differential pressure. Therefore, for TSP wear, the SIPC and AILPC are satisfied for CM.

3.2 Dent and Ding Inspections

The following dent and ding indications were inspected by +POINT probe per the inspection criteria in Section 2.0, and no degradation was found.

- two greater than 5-volt dent indications
- one previously unreported ding indication greater than or equal to 1 volt
- eleven dent/ding indications greater than or equal to 1 volt that were previously reported and never inspected by +POINT probe

3.3 Factory Impacted Tube Inspections

During SG fabrication at the factory, AVB retainer bars in SG 2-4 were removed and relocated. During the removal process, twelve (12) tubes in SG 2-4 were visibly damaged in the periphery of the U-bend by a grinding tool. In order to assess the condition of the tubes resulting from the event, eddy current inspection (both bobbin and +POINT) of the 12 tubes was performed at the factory, prior to the PSI inspection. Of these, 3 tubes were repaired by plugging at the factory, thus leaving 9 tubes in service that had no indication of degradation.

In 2R21, these 9 tubes were inspected by both bobbin and single coil +POINT in the U-bend region of interest (similar to 2R15 and 2R18 inspections). Small dings were reported by bobbin in 6 of the tubes. No degradation was detected by +POINT probe.

3.4 Tube Noise Inspections

Eddy current noise monitoring was implemented for the collected bobbin data. The bobbin probe data was monitored for noise and the potential for noise to mask degradation in various regions of interest, including AVB, TSP and top of tubesheet locations. Locations where the noise measurements exceeded the amplitude thresholds established in the Degradation Assessment were reviewed by the eddy current data analysis team for the need to perform further analysis or ECT inspection. There were four top of tubesheet locations that exceeded the pre-established threshold values, were assigned a distorted tubesheet indication (DTI) code, and were inspected by +POINT probe with no detectable degradation found. There were 46 TSP locations that exceeded the pre-established threshold values, all at the top TSP edge locations that were influenced by the U-bend transition signal. All signals were reviewed by the Lead Level III data analyst and confirmed that none of the noise signals could mask a flaw. Therefore, diagnostic +POINT probe inspection was not required for these 46 locations.

3.5 Tube Plug Visual Inspections

All previously installed hot leg and cold leg tube plugs were visually examined. SG 2-4 has three plugged tubes with six tube plugs installed (one plug per tube end). The tube locations are R76C96, R90C38, and R91C39. All tube plugs are Alloy 690 shop welded plugs and were installed during SG fabrication. No evidence of plug degradation, excessive boron deposits, or wetness was noted during the plug visual examination.

3.6 Channel Head Visual Inspections

A visual inspection of the SG channel head bowl was performed for all SGs based on Westinghouse Nuclear Safety Advisory Letter NSAL-12-1. Visual

inspection of the primary side channel head internal surfaces including the cladding, tubesheet, divider plate, and all associated welds were acceptable with no impact to SG and tube integrity. Two anomalous conditions were noted for tracking purposes and were not indicative of cladding degradation.

4.0 Results of Secondary Side Inspections and Integrity Assessment

4.1 Sludge Lancing and Grit Screen Visual Inspections

Sludge lancing at the top of tubesheet was performed in each SG. A total of 34.75 lbs of deposits were removed from all SGs through the sludge lancing program.

The sludge lance grit tank screens for SG 2-1 and SG 2-4 were visually inspected for the presence of foreign objects following the completion of the tubesheet cleaning. There was no material collected by the grit tank screens for SG 2-2 and SG 2-3. The objects in the grit screen consisted of pieces of sludge rocks (agglomerations of magnetite), pieces of soft gasket filler, thin metal strips, a small machine curl, and eight fragments of eroded feedwater heater (FWH) tube support/baffle plates. These objects are similar and consistent with the objects found in prior outages. The foreign material was characterized and defined as objects that are not expected to cause significant tube wear and have no adverse effects on tube integrity.

4.2 Top of Tubesheet Visual Inspection and FOSAR

After sludge lancing in each SG, a top of tubesheet visual inspection and FOSAR was performed.

The following tube bundle areas were visually inspected:

- tubesheet trough region
- tubesheet annulus region
- tube bundle periphery tubes (inspection from annulus)
- tube lane inspection
- in-bundle inspections, as follows:
  - jot leg Columns 50 through 70, which are the center 20 columns
  - cold leg Columns 60 through 70
  - hot leg and cold leg Columns 20, 40, 80 and 100
  - hot leg and cold leg peripheral high flow regions:
    - Columns 1-5 and 6-9, Rows 1 through 9
    - Columns 114-101 and 119-115, Rows 1 through 5

The in-bundle visual inspections revealed some hard scale on several tube locations in the hot leg low flow region, which was not removed during sludge lancing operations.

The visual inspection identified eleven foreign objects. Five objects were retrieved from the SGs, including a zip tie wrap, a small wire, and three FWH tube support/baffle plate fragments, one of which was initially wedged. The objects not retrieved were minor gasket filler, a small wire, a small object that resembled a sliver of glass, and a wedged FWH tube support/baffle plate fragment. The foreign material was characterized and defined as objects that are not expected to cause significant tube wear and have no adverse effects on tube integrity.

4.3 Evaluation of FWH Tube Support/Baffle Plate Fragments

As discussed above, eight FWH tube support/baffle plate fragments were found in the sludge lance grit screens. Four fragments were also observed during tubesheet inspections, as discussed below. Several fragments have been previously found in prior outage sludge lance grit screens, and no tube wear was reported in the prior ECT exams.

The fragments are triangular, indicative of eroded FWH tube support/baffle plate fragments, with a length of about 0.4 inch, and width and height of about 0.2 inch. The width and height of a fragment make it possible to migrate out of a feedring spray nozzle hole (0.27-inch diameter). In addition, the length of a fragment makes it possible to get lodged between two tubes, as observed in 2R21, because the gap between two tubes is about 0.4 inch.

A fragment was observed to be firmly wedged at the SG 2-4 hot leg top of tubesheet between tubes R51C65 and R52C66 and could not be removed. +POINT probe inspections were performed on the two affected tubes and the surrounding nineteen tubes to form a box around the fragment. The fragment was reported by +POINT probe as a potential loose part (PLP) indication at the two tubes, and no tube wear was detected. Therefore, there is no impact to tube integrity.

In addition to the wedged fragment, three other fragments were identified at the top of tubesheet and successfully retrieved. Two fragments were found loose at the SG 2-1 cold leg top of tubesheet and SG 2-3 hot leg top of tubesheet, and each fragment was pushed to the peripheral trough region where they were retrieved. Because these fragments were likely relocated due to sludge lancing, no additional diagnostic +POINT probe inspection was performed because their original location was unknown. No evidence of tube wear was visually found on the tubes adjacent to the fragment locations, and no tube wear was reported by bobbin probe. One fragment was found wedged at the SG 2-2 cold leg top of tubesheet between tubes R5C47 and R6C48. The fragment was dislodged during FOSAR and retrieved. +POINT probe inspections were performed on the two affected tubes and the surrounding twenty-two tubes to form a box around the locations. No foreign object tube wear was detected by +POINT probe. Therefore, there is no impact to tube integrity.

For the fragment that is wedged between hot leg tubes R51C65 and R52C66 in SG 2-4, it is acceptable for this object to remain in the SG for future operating cycles, without the need for preventive tube plugging. If this object becomes dislodged during future operation, it would likely migrate to lower flow regions of the bundle (in the direction of the flow).

4.4 ECT Inspection for Foreign Object Wear

No tube wear from foreign objects was detected during the ECT inspections. The bobbin coil examination of 100 percent of the tubes in each SG provided a high assurance in the detection of foreign object wear, should it occur. For the detection of foreign object wear at the top of the tubesheet expansion transition up to 0.5 inch above the tubesheet, a bobbin coil 3-frequency mix ("turbo" mix) was used. A site validation demonstration was performed that provided high assurance that significant flaws caused by foreign object wear could be detected. A further demonstration was performed to determine the bobbin coil 3-frequency mix detection capabilities for foreign object wear that could be caused by objects of the size and shape of the FWH tube support/baffle plate fragments, and concluded that there is a high likelihood of detecting potential wear flaws from fragments that are 20 percent TW and greater.

5.0 Conclusions

SG tube ECT inspections, tubesheet cleaning, top of tubesheet visual inspections, and channel head visual inspections were conducted in 2R21. The CM assessment concludes that, based on the results of the 2R21 inspections, none of the SG performance criteria were exceeded since the last SG inspection in 2R18. The operational assessment, not included in this report, concludes that there is reasonable assurance that operation of the DCPP Unit 2 SGs for the next four operating cycles will not cause any of the SG performance criteria to be exceeded.

Table 1
Summary of 2R21 Eddy Current Indications

Code	Description	SG 2-1	SG 2-2	SG 2-3	SG 2-4	Total
ADS	Absolute Drift Signal	33	16	16	11	76
BLG	Bulge	2	8	1	1	12
DNG	Ding	86	30	7	61	184
DNH	Ding or Dent with History	88	28	9	60	185
DNT	Dent	15	6	1	5	27
DSI	Distorted Support Indication	0	2	5	15	22
DTI	Distorted Tubesheet Indication	2	0	2	0	4
INF	Indication Not Found	0	0	1	1	2
INR	Indication Not Reportable	26	4	15	13	58
MBM	Manufacturing Burnish Mark	3	1	2	3	9
NDD	No Degradation Detected	4282	4342	4385	4369	17378
NDF	No Degradation Found	12	4	3	17	36
NQI	Non-Quantifiable Indication	1	0	0	0	1
NQS	Non-Quantifiable Signal	4	2	0	1	7
PDS	Pilger Drift Signal	29	74	9	4	116
PLP	Possible Loose Part	0	0	0	2	2
PRO	Tube-to-Tube Proximity	2	4	6	4	16
RBD	Re-Test Bad Data	2	3	6	5	16
RND	Re-Test No Data	0	1	0	0	1
WAR	Support Wear Indication	0	2	4	14	20

Table 2
2R21 TSP Wear Summary

No.	SG	Row	Col	TSP	+POINT Volts	+POINT Depth (%TW)	+POINT Length (inch)
1	22	2	116	7C	0.24	11	0.56
2	22	9	3	5C	0.18	9	0.59
3	23	61	15	6H	0.18	8	0.41
4	23	86	86	6H	0.17	8	0.38
5	23	88	36	7H	0.32	14	0.53
6*	23	96	52	8H	0.23	10	0.35
7	24	1	7	6C	0.15	7	0.65
8	24	1	9	6C	0.16	8	0.55
9	24	1	11	6C	0.22	10	1.04
10	24	4	68	6C	0.30	13	1.25
11	24	10	2	5C	0.20	9	0.40
12*	24	40	16	5C	0.15	7	0.42
13*	24	47	9	7C	0.21	9	0.92
14	24	49	15	5C	0.09	4	0.27
15	24	55	15	5C	0.11	5	0.27
16*	24	60	106	6C	0.31	14	0.65
17	24	77	25	5C	0.14	7	0.42
18	24	84	88	6H	0.24	11	0.43
19	24	85	47	5C	0.08	4	0.23
20*	24	89	59	8C	0.21	10	0.65

(*) Five new indications reported in 2R21.

Table 3
SG Inservice Inspection
First ECT Inspection Period
Examinations Completed and Scheduled

Year	2009	2011	2013	2014	2016	2018	2019	2021	2022
Outage	2R15	2R16	2R17	2R18	2R19	2R20	2R21	2R22	2R23
Nominal Cycle Length month		19	21	20	19	21	20	19	21
SG EFPY per cycle	1.35	1.43	1.61	1.47	1.46	1.67	1.50	1.33	1.36
SG EFPM cumulative	16	33	53	70	88	108	126	142	158
Tech Spec ECT Period EFPM		144							
SG ECT period EFPM		17	37	54	72	92	110	126	142
SG EFPM between ECT inspections				54			56		
ECT	Yes			Yes			Yes		
% Bobbin	100			100			100		

Figure 1
DCPP Unit 1 and 2 Westinghouse Delta 54 Steam Generator Tubesheet Map

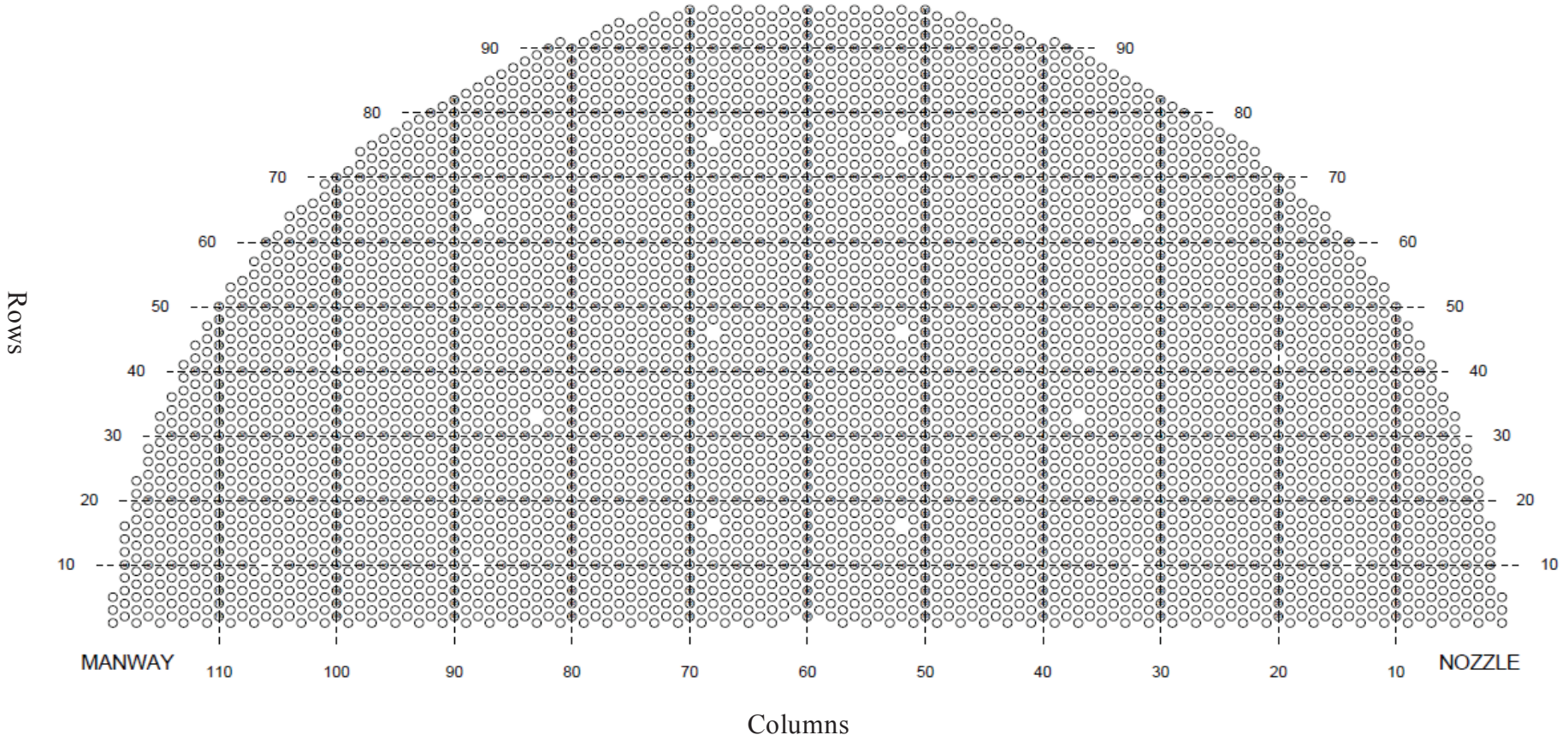
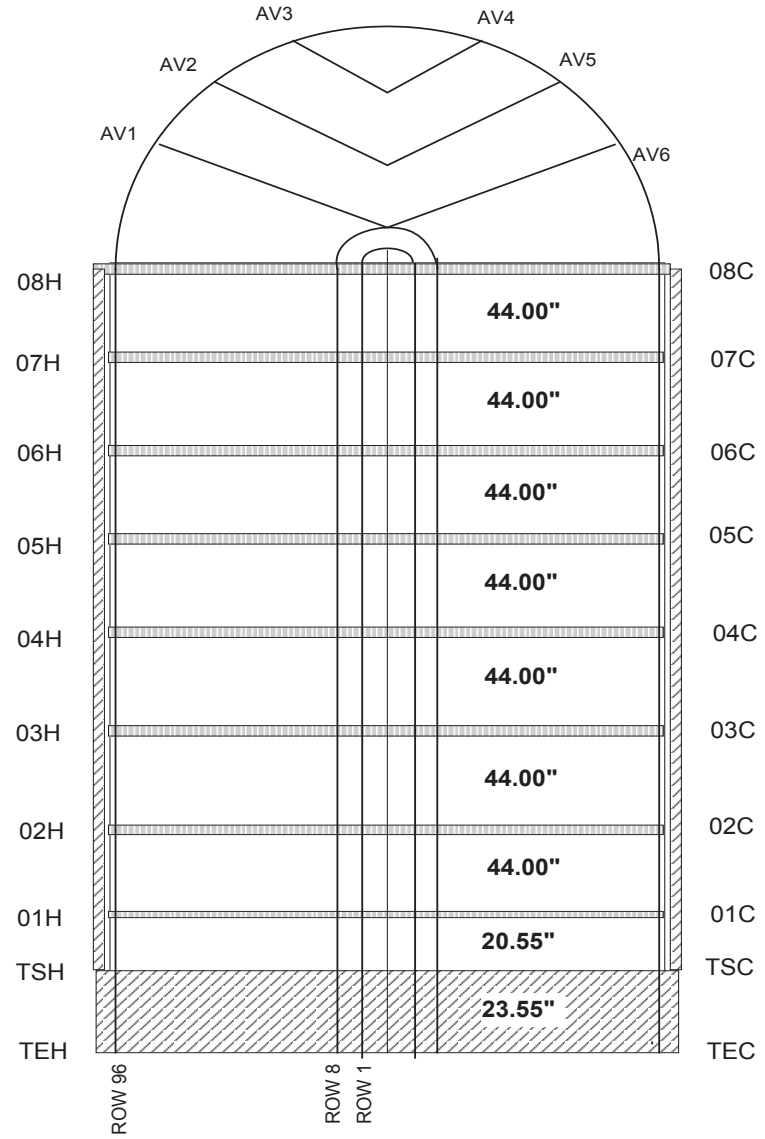


Figure 2
Sketch of DCPP Unit 1 and 2 Westinghouse Delta 54 Steam Generator



Westinghouse Delta 54 RSG

Support thickness is 1.125"

TSP Spacing values are center to center